

Extended Summaries

1st European Pesticide Residues Workshop

Pesticides in Food and Drink

The following extended summaries are based on papers presented at the above meeting, held at Alkmaar, The Netherlands on 10–12 June 1996. The summaries published here are entirely the responsibility of the authors and do not necessarily reflect the views of the Editorial Board of Pesticide Science.

Organochlorine Pesticide Residues in Northern Ireland

Samuel H. Mitchell

Food Science Division, Department of Agriculture for Northern Ireland, Newforge Lane, Belfast, BT9 5PX, UK

It is well recognized that residues of organochlorine pesticides e.g. DDT, HCH (hexachlorocyclohexane), aldrin and dieldrin have been a major concern regarding pesticide contamination of food and the environment during the past 30 years. Their lipophilic, persistent and bioaccumulative properties have been extensively documented. In Northern Ireland (NI) the Department of Agriculture has carried out surveillance monitoring for these and related compounds for more than 25 years. It is generally believed that a steady

decline in the levels of organochlorine pesticide (OC) residues in food has occurred during the last two decades as a result of changes in agricultural practice, e.g. the withdrawal of such compounds as DDT and aldrin from general use. However, whilst the data from NI support a general decline in OC residues, this decline has not been steady and, indeed residues of some compounds increased markedly at one stage during this period before showing a decline as shown in Fig. 1 for γ -HCH residues in cattle and pigs during the early 1980s. However all the mean concentrations of γ -HCH residues in cattle, sheep and pigs are below the recently introduced maximum residue levels (MRLs).¹ Routine monitoring of residues in dairy produce revealed pronounced seasonal fluctuations in HCH concentrations in, for example, butter (Fig. 2). Approximately 90% of the HCH residue was present as α -HCH and not the insecticidal isomer γ -HCH. Investigations revealed that a leading HCH louse powder was, in fact,

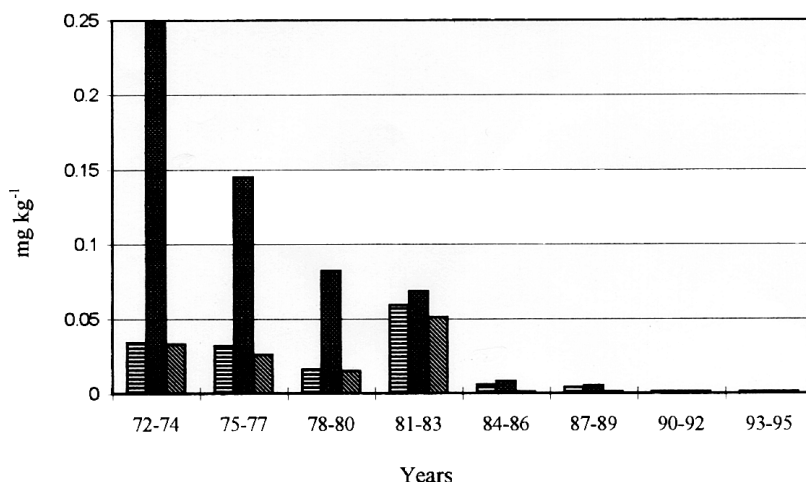


Fig. 1. Three-year averages for γ -HCH (lindane) residues in kidney fat from (▨) cattle, (■) sheep and (▧) pigs in N. Ireland over the period 1972–95.

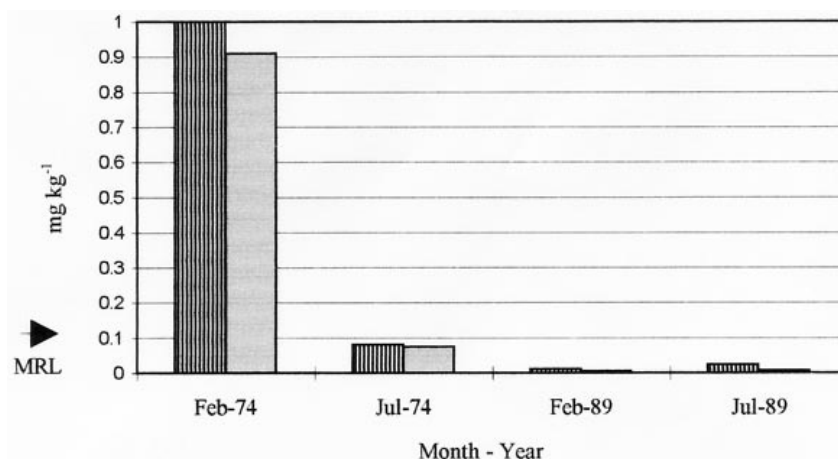


Fig. 2. Concentration of (▨) total (α -, β - and γ -HCH) and (▩) α -HCH in butter from N. Ireland over the period Feb. 1974–July 1989.

technical grade HCH with α -HCH comprising the major constituent. The subsequent withdrawal of this formulation resulted in a rapid decline in the concentration of α -HCH residues in dairy produce.² It is inter-

esting to note that this pattern of residues is reflected in the data for animal kidney (Fig 3). Recent monitoring has shown only low levels of OC residues in both dairy produce and animal kidney fat (Figs 2, 3).

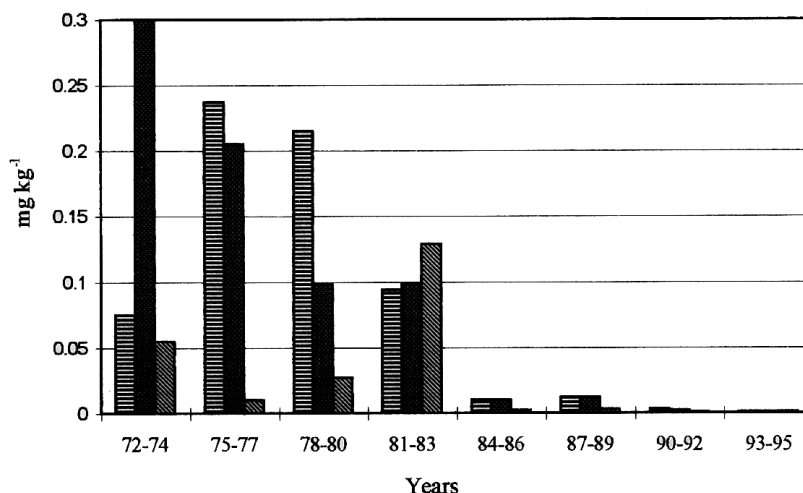


Fig. 3. Three-year averages for total HCH in (▨) cattle, (■) sheep and (▩) pig kidney fat in N. Ireland over the period 1972–95.

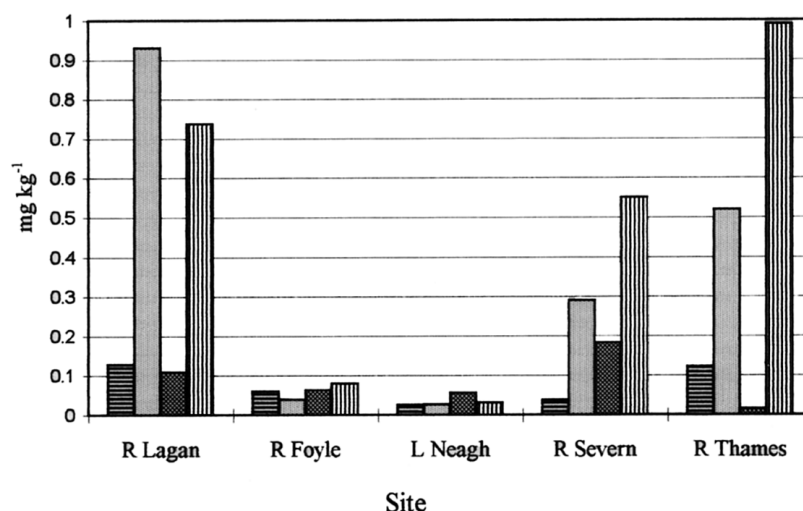


Fig. 4. Organochlorine residues in eels from different parts of the UK 1986–87. (▨) total HCH; (▩) dieldrin; (■) DDT (pp' -DDT, pp' -DDE and pp' -TDE); (▤) polychlorinated biphenyls.

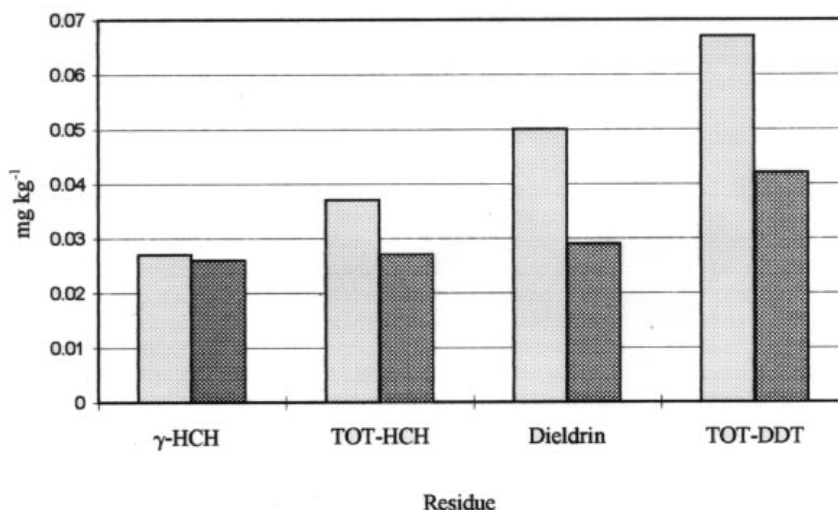


Fig. 5. Comparison of organochlorine residue levels in eels from (□) rural and (■) urban sites along the River Lagan in N. Ireland. TOT = total residues; i.e. all isomers.

Eels (*Anguilla anguilla* L.) are a significant local industry in NI and are also a good indicator of environmental quality. A major survey of contaminants in eels in the United Kingdom (UK) was undertaken in 1986–87.³ This was a particularly important survey for NI as the eel fishing industry in NI, which is centered on Lough Neagh, supplies approximately 60% of UK-produced eels. Data for three main OC residues and polychlorinated biphenyl residues from five sites in the UK indicated that eels from Lough Neagh are relatively uncontaminated (Fig. 4). This was confirmed by a recent survey of OC residues in eels from commercially fished areas in England and Wales and NI.⁴ The residue levels found in eels from both the River Lagan and the River Thames are consistent with those expected in eels from rivers which flow through major conurbations. However, local differences on a watercourse can be demonstrated. In NI a survey of OC residues in eels along the River Lagan indicated different patterns of residue concentrations in eels from urban and rural sites. Total DDT concentrations showed the greatest difference (Fig. 5). Shellfish are another food source of increasing importance and have been monitored under various EC directives for approximately 20 years and

also show low levels of OC residues.⁵ This is in agreement with other data for OC residues in seals from the coast of NI.⁶

REFERENCES

1. Anon. *Pesticides (Maximum Residue Levels in Food) Regulations (Northern Ireland)*, 1988.
2. Harper, D. B. & McAnally, R. J., Seasonal fluctuations in the concentration of BHC residues in butter. *Pestic. Sci.*, **8** (1977) 35–42.
3. Anon. Report of the Working Party on Pesticide Residues: 1985–1988. *Food Surveillance Paper No. 25*, Ministry of Agriculture, Fisheries and Food (1989). HMSO, London UK.
4. Anon. Annual Report of the Working Party on Pesticide Residues: 1989–90. *Supplement to The Pesticides Register 1991*, Ministry of Agriculture, Fisheries and Food (1991). HMSO, London UK.
5. Anon. *PRL Report No. 0045*, Food Science Division, DANI, Belfast, NI, 1996.
6. Mitchell, S. H. & Kennedy, S., Tissue concentrations of organochlorine compounds in common seals from the coast of Northern Ireland. *Sci. Total Environ.*, **115** (1992) 163–77.